REMARKS

Reconsideration and allowance of the subject application in view of the foregoing amendments and the following remarks is respectfully submitted.

Claims 1, 3-12 and 14-16 remain pending in the application. Claim 2 has been cancelled. Applicant appreciatively notes that claim 13 contains allowable subject matter.

Claims 1-12 and 14-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Wariishi et al. In response, claim 1 has been amended to include the limitations of claim 2. Applicant believes the claims are patentable over the applied reference for the reasons discussed below.

The present invention is directed to a semiconductor which produces electrons under the irradiation of light on the semiconductor (see Figure 1). An oxidation-reduction material has a redox potential positive compared with the potential of the semiconductor as recited in amended claim 1. The electrons produced by the semiconductor are supplied to the oxidation-reduction material under the irradiation of light.

The oxidation-reduction material is reduced in the presence of a cation and its crystalline structure is thus converted. The supplied electrons are stored in the oxidation-reduction material having the converted crystalline structure (for example, tungsten blonze).

By contrast, in the photoelectric conversion device in Wariishi et al., light is injected into a photosensitive layer 20 and excites dye 22. The resultant high energy electrons therein are transferred to a conduction band of semiconductor fine particles 21, and then diffused to reach an electrically conductive layer 10. At this time, the dye 22 is in oxidized form.

In a photoelectrochemical cell, electrons in the conductive layer 10 are returned to the oxidation product of the dye 22 through a counter conductive layer 40 and a charge transport layer 30 while working in an outer circuit so that the dye is regenerated. The photosensitive layer 20 works as an anode (see col. 22, lines 38-57). The semiconductor fine particles 21 are described in column 24, line 1 through column 25, line 3. The dye 22 is described in column 26, line 55 through column 53.

According to claim 1, a semiconductor has a conduction band and produces electrons under the irradiation of light on the semiconductor. The electrons are excited from ground band (ground state) to conduction band, and then emitted. According to Wariishi et al., the dye 22 produces electrons under irradiation of light on the dye 22. The dye 22 is described in column 26, line 55 through column 53 in Wariishi et al. The dyes described in Wariishi et al. are organic low molecular compounds, and thus electrically insulating. Electrons in π orbital are emitted from the dye 22. The dyes 22 in Wariishi et al. are not photosemiconductor due to the following reasons.

(a) The dye 22 is an electrically insulating low molecular organic compound.

(b) Electrons are drawn from π orbital in the dye 22.

According to claim 1, the electrons produced by the semiconductor are supplied to the oxidation-reduction material under the irradiation of light. By contrast, according to Wariishi et al., high energy electrons in the dyes 21 are transferred to a conduction band of the semiconductor particles 21, and then diffused to reach an electrically conductive layer 10.

Further, according to Wariishi et al., electrons are transferred from the dye to the conduction band of the semiconductor 21.

By contrast in claim 1, electrons are transferred from the semiconductor to the oxidation-reduction material. The flow of the electrons is just opposite.

According to claim 1, the oxidation-reduction material is reduced in the presence of a cation and its crystalline structure is converted. The supplied electrons are stored in the oxidation-reduction material having the converted crystalline structure (for example, tungsten blonze).

By contrast in Wariishi et al., the electrons are supplied into the conduction band of the semiconductor and reaches the conductive layer 10. Also, no cation is supplied to the semiconductor. The electrons does not affect the crystalline structure of the semiconductor. The semiconductor does not store electrons in itself for subsequent discharge of the electrons.

As described above, Wariishi et al. is very different than the invention recited in independent claim 1.

Itaya et al. discloses a method of providing an electrolytic process for the synthesis of iron (III) hexacyanoferrate (II). It is a chemical electrolytic process. The technical field is completely different and no common technical background between Itaya et al. and Wariishi et al. Thus, Itaya et al. does not overcome the deficiencies discussed above with respect to Wariishi et al.

According to Wariishi et al., the dye 22 discharges electrons and is then converted to its oxidized form. The electrons are supplied into the semiconductor, which does not store the electrons. The crystalline structure of the semiconductor is not changed to its reduced form. Therefore, it is meaningless to combine the semiconductor and Itaya et al. electrolytic reaction and thus these references would not be combined in the manner suggested by the Examiner. For at least these reasons, claim 1 should be patentable over the applied references and the claims should be allowable. Dependent claims 3-12 and 14-16 recite additional, important limitations and should be allowable for the reasons discussed above with respect to claim 1 as well as on their own merits. The obviousness rejection should be withdrawn.

All objections and rejections having been addressed, it is respectfully submitted that the present application should be in condition for allowance and a Notice to that effect is earnestly solicited.

To the extent necessary, a petition for an extension of time under 37 CFR 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,
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